

Commonwealth of Massachusetts

Division of Marine Fisheries

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Paul J. Diodati
Director



MEMORANDUM

TO: General Distribution
FROM: Paul J. Diodati, *Director*
SUBJECT: Shark Research and Management
DATE: May 1, 2000

As the newly appointed Director of the Massachusetts Division of Marine Fisheries, I am concerned over recent correspondence I have received alleging that shark resources are being overexploited by Massachusetts fisheries to no concern of this agency. The purpose of this letter is to inform you of the efforts taken by my agency to study and monitor sharks off our coast and to give you our perspective relative to shark management.

Research. The Massachusetts Division of Marine Fisheries (DMF) has been actively involved in shark research since 1987. Our agency has developed a program that describes the ecology of local shark species, their relative abundance and the impacts fisheries may be having on them. Projects include the Massachusetts Shark Research Project, Sport Fishing Tournament Monitoring Project, and Stress Physiology Project.

The specifics of each are highlighted as follows:

Massachusetts Shark Research Program (MSRP) was established in 1988 to (a) study the ecology and relative abundance of sharks in Massachusetts coastal waters; (b) educate the public about sharks and their biology; and (c) collaborate with other shark researchers throughout the United States and other parts of the world. To the best of my knowledge, Massachusetts is the only state on the eastern seaboard that has established such a program within its fisheries agency.

Through longline and angler surveys, the MSRP has identified primary and/or secondary shark nursery areas in Massachusetts waters for smooth dogfish (*Mustulus canis*), sandbar shark (*Carcharhinus plumbeus*), sand tiger shark (*Odontaspis taurus*), and dusky shark (*Carcharhinus obscurus*). These same survey efforts have allowed for the generation of relative abundance (CPUE) indices for these species. In the past 10 years, MSRP personnel have delivered over 200 slide and video presentations on the ecology and study of New England sharks at primary and secondary schools, universities, fishing clubs, conservation groups, museums, and other members

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David M. Peters, *Commissioner*

of the public and private sector throughout New England. These presentations have highlighted the diversity, biology, and importance of local shark species as well as the efforts of this agency through the MSRP to increase our understanding of these animals. Over this same period, a number of cooperative research projects have been fostered by the MSRP. These include, but are not limited to, collaborative research with the NMFS Cooperative Shark Tagging Program, the University of Rhode Island, the University of Massachusetts, the Virginia Institute of Marine Science, the University of California (Fullerton), the Tennessee Aquarium, the New England Aquarium, the Woods Hole Oceanographic Institution, the Marine Biological Laboratory, Manly Aquarium (Australia), the Hawaii Institute of Marine Biology, and Tufts University.

Massachusetts Sport Fishing Tournament Monitoring Project (MSTMP) has collected comprehensive catch and effort data at all big game fishing tournaments (tunas, marlin, and sharks) since 1987. Massachusetts is the only state that collects total catch information at these events, including number of sharks boated, released, tagged, and lost. This allows for a more robust calculation of relative abundance (CPUE) indices that may be used to monitor the health of shark populations; there is a paucity of these indices available from recreational shark fisheries. At the recent Pelagic Shark Workshop in California, DMF personnel presented a paper that summarized the 13-year CPUE time series for blue and mako sharks. This was one of only two papers presented on relative abundance indices generated from recreational fisheries. Tournament landings also allow DMF biologists to characterize the catch relative to size and age structure, sex, and reproductive status. In Massachusetts, tournament fishermen release over 95% of the sharks they catch.

Massachusetts Stress Physiology Project (MSPP) was initiated in 1993 to study the physiological effects of catch and release angling on large pelagic gamefish, including sharks. To date, blood samples coupled with evidence from tag recaptures and ultrasonic telemetry show that blue sharks are capable of recovery after exposure to angling stress. These results were presented at the National Symposium on Catch and Release last December in Virginia and at the Pelagic Shark Workshop last month in California. Using this study as a template, DMF has initiated a collaborative research project with NMFS (RI) and URI to investigate the physiological effects of catch and release (rod and reel, longline) on the survival of neonatal, juvenile, and adult sandbar sharks.

Management. A number of shark species are landed in Massachusetts annually by recreational and commercial fishermen. As indicated above, tournament catch and effort is used by DMF to characterize the recreational fisheries for sharks in the Commonwealth. When compared to NMFS Marine Recreational Fisheries Statistics Survey data, our data were found to better characterize this fishery.

Commercial landings estimates are obtained from the NMFS Economics and Statistics Division. According to this source, dogfishes comprised 98% of the sharks landed in Massachusetts from 1990 to 1997. Annual Massachusetts landings of “non-dogfish” sharks has ranged 37-61mt during the period 1990-1997, with an average of 52mt. Using the shark species groups established by the NMFS shark FMP in 1993, these landings were dominated by pelagic sharks, with large coastal sharks (LCS) representing an average of only 0.1%.

NMFS recognized that it was important to manage dogfish and other sharks separately when the first shark FMP was implemented in 1993. This clear separation was maintained when the FMP was modified in 1997 and 1999. The interstate management body, the Atlantic States Marine Fisheries Commission (ASMFC), recently decided (1999) to develop separate management plans for dogfish and other shark species as well, although these remain in the early

stages of development. To date, DMF has yet to establish regulations pertaining to sharks. The Commonwealth has not adopted the current NMFS regulations because virtually no commercial LCS and pelagic shark fisheries exist in Massachusetts waters. It is anticipated that DMF personnel will be deeply involved in the development of both dogfish and shark ASMFC management plans.

Dogfish. Less than 10 years ago, NMFS actively encouraged New England fishermen to enter the then “under-exploited” dogfish fishery. Their thinking was that the redirected effort would help reduce fishing mortality on depressed (and economically more valuable) groundfish resources, such as cod, haddock and flounders, and reducing abundance of elasmobranch species would create an ecological advantage for recovering groundfish stocks. After making considerable investment in fishing technology, product handling, shoreside processing, and product marketing, the Massachusetts industry became fully engaged in the dogfish fishery, and Massachusetts ports now lead the Nation in dogfish landings. Processed dogfish products are marketed throughout the world. Dogfish backs are exported to France, Belgium, Italy, England, and the Netherlands. Belly flaps are marketed in Germany. Fins and tails go to Canada, China, and Taiwan. Cartilage and livers are used for medical and pharmaceutical research in Switzerland, Italy, and France. Dogfish heads are used in Japan and locally as bait in the conch fishery. Even the skin and body oils have a market. Very little goes to waste.

Currently, the dogfish fishery is overfishing the resource. Too many mature females are being harvested. The first federal plan to manage the fishery was implemented on May 1, virtually shutting down the industry for the next 17 years. The federal plan attempts to achieve an unprecedented low fishing mortality rate, around 0.03, and to create a female spawning biomass of 200,000 metric tons. According to NMFS calculations, it will take close to 17 years to reach a 200,000 mts. spawning biomass.

I offer an alternative approach to dogfish management developed by DMF staff. This approach incorporates concerns of the industry, conservation organizations, and my view of NMFS’ dilemma of applying the Sustainable Fisheries Act and the National Standards to the vexing problem of recovering the mature female biomass of this abundant yet overfished small-shark species.

In any approach to managing this resource, we cannot minimize certain facts. Spiny dogfish are slow growing/maturing, and the population has low resiliency. The fishery has intensified over the last decade and has cropped the very largest females (greater than 90 cm). This is evident in both the Massachusetts DMF inshore bottom-trawl survey and the NMFS groundfish surveys. Threshold fishing mortality rate, or the maximum fishing rate when the stock is rebuilt is very low at $F_{MSY} = 0.118$, with size at entry of 80 cm. Fishing mortality has been well above F_{MSY} since the mid-1990s. If fishing mortality is not reduced to a sustainable level, then the population will collapse. Once collapsed, the spiny dogfish population will rebuild very slowly. NMFS reports that recent recruitment has been poor, but a pulse of good pre-adult recruitment is predicted that presents an immediate rebuilding opportunity.

The following alternative proposal for federal management is based on identical assessment procedures and assessment information that NMFS has used to form the plan approved by the Secretary of Commerce:

- Regulate for a constant annual quota of 4,000 mts. (8,820,000 lbs.) beginning in 2000. This will reduce fishing mortality to about 0.08 in the first year. Rebuilding time for the resource will be the same as that associated with the NMFS plan – 17 years. This quota should allow

a small fishery and maintenance of some processing infrastructure and avoid closures of other fisheries because of high levels of dogfish bycatch. *Keeping a constant quota will mean that the fishing mortality rate will decline as the population increases.*

Rationale :

This proposal allows a directed fishery that maintains infrastructure and allows the collection of biological data on the stock while rebuilding the resource and eliminating overfishing. The quota allows for higher trip limits, thus a small directed fishery, which should reduce regulatory discards.

Advantages. This proposal fits within the SFA and NMFS guidelines and:

- 1) Utilizes a rebuilding fishing mortality rate that is below the F_{MSY} target. Thus, this proposal immediately ends “overfishing” and rebuilds to SSB_{max} . This meets National Standard 1: *“Conservation and management measures shall prevent overfishing while achieving on a continuing basis, the optimum yield from each fishery for the United States fishing industry.”*
- 2) Better meets National Standard 8: *“conservation and management measures shall, consistent with the requirements of this act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.”*
- 3) Better meets National Standard 9, *“conservation and management shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.”*
- 4) Is based on the same scientific information as the federal plan.

Arguments to allow/disallow this proposal will be based on policy decisions and legal interpretations rather than technical issues.

Disadvantage. With a constant quota of 4,000 mts. annual yield to the fishery is distributed more equally over the 17-year rebuilding period, not allowing for large escalation in harvest as stock conditions improve. For instance, in 2015 landings can increase to about 11 million pounds, while under the NMFS plan landings by then can increase to more than double that amount.

I hope that this clarifies my concern and position on management of the spiny dogfish fishery and sets the record straight regarding the Commonwealth’s commitment to research and management of shark species in general.